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“CRACKLE” DECORATIVE COATING**R. V. Manukyan¹ and N. S. Davydova¹**Translated from *Steklo i Keramika*, No. 12, p. 30, December, 1999.

New compositions of batches and glazes for crackle decorative coatings are described.

The production of artistic ceramic and faience articles for interior decoration calls for the development of attractive new decorative coatings. Crackle is among such coatings. The Institute of General and Inorganic Chemistry of the Armenian Academy of Sciences developed a composition and technology for crackle coating.

Some methods of crackle production are based on the preparation of a low-melting glaze with an additive of 15–20% gypsum. The gypsum component results in the emission of sulfur oxide which pollutes the atmosphere and deteriorates the article surface, which becomes bubbly (USSR Inventor's Certif. 1622356).

Another type of crackle coating includes perlite, borax, zinc oxide, and chalk. The decorative effects of this coating are based on the emergence of crazing after the article is fired, immersed in water, and then immersed in pigment so-

lution and fired. As the result, a single-type product is obtained on the basis of a multi-stage technology (USSR Inventor's Certif. 1460053).

It is currently expedient to reduce energy consumption, simplify the technology, and decrease other expenditures per product unit.

The results of our studies make it possible to simplify the technology, i.e., to produce a crackle coat without fritting, through simple mixing of material components in an aqueous medium, subsequent deposition of the coating on dried articles, and finally firing (USSR Inventor's Certif. 1715972).

The composition of the proposed coating includes concentrated nepheline, which is a waste resulting from the concentration of nepheline sienite by potassium or sodium alkaline solution.

The chemical composition of raw materials used in the glaze preparation is given in Table 1.

After dosing components, the glaze batch is milled in water, and the resulting suspension is deposited on articles

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TABLE 1

Raw material	Weight content, %							
	SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	CaO	Na ₂ O	K ₂ O	calcination loss
Calcium metasilicate	29.98	2.92	—	—	36.50	—	—	30.60
Concentrated nepheline	39.82	25.18	3.59	0.53	3.90	17.53	1.23	8.22
Quartz sand	99.56	—	—	—	—	—	—	0.44

TABLE 2

Mixture	Whiteness, %	TCLE, 10 ⁻⁷ °C ⁻¹	Chemical composition of coating, wt. %							Composition of glaze batch, wt. %			
			SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	CaO	Na ₂ O	K ₂ O	calcium metasilicate	concentrated nepheline	quartz sand	titanium oxide
1	90	75	60.29	8.82	1.14	9.60	14.12	5.64	0.39	30.73	28.31	32.67	8.29
2	88	78	59.38	9.86	1.30	9.10	13.50	6.40	0.46	29.08	32.15	30.92	7.85
3	85	80	58.43	10.87	1.49	8.54	12.87	7.29	0.51	27.15	36.67	28.85	7.33

and fired at a temperature of 1000 – 1100°C. A decorative coat in the form of small brilliant white grains or drops emerges on the fired articles (at 1000°C), and at 1100°C an attractive smooth white coat in the form of rhombuses, triangles, and stripes is formed.

Table 2 shows the chemical composition of the crackle coating, its whiteness, and TCLE, as well as the compositions of glaze mixtures.

With a further increase in the concentrated nepheline content in the batch composition, the amount of alkaline oxides grows; consequently, the glaze melting temperature decreases and, finally, the decorative outlook of the coating disappears.

In order to obtain decorative crackle coating, it is necessary to restrict oneself to the three specified compositions with a firing temperature of 1000 – 1100°C.